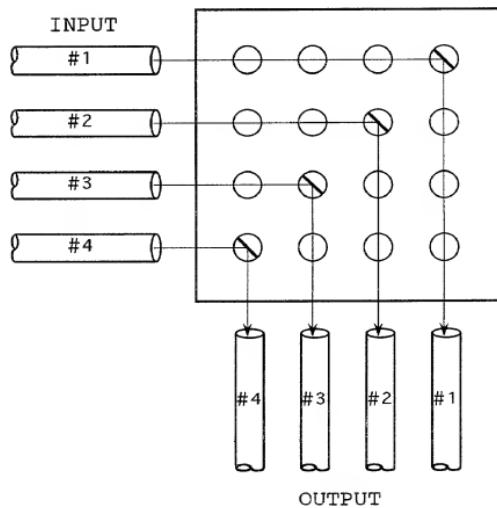


FIG. 1

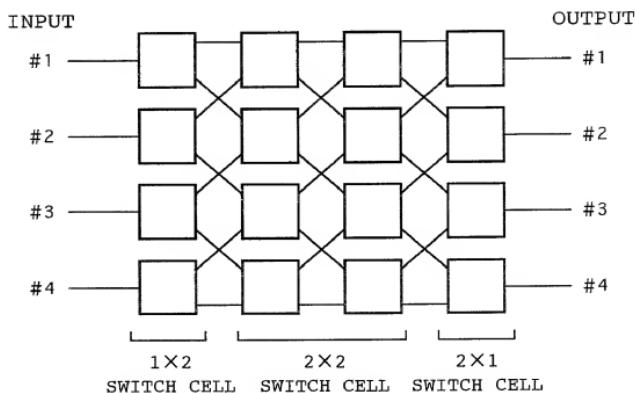
PRIOR ART



(\ominus) ; SWITCH CELL (ON STATE; MIRROR INSERTED)

(\circ) ; SWITCH CELL (OFF STATE; MIRROR NOT INSERTED)

FIG.2 PRIOR ART



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FIG. 3

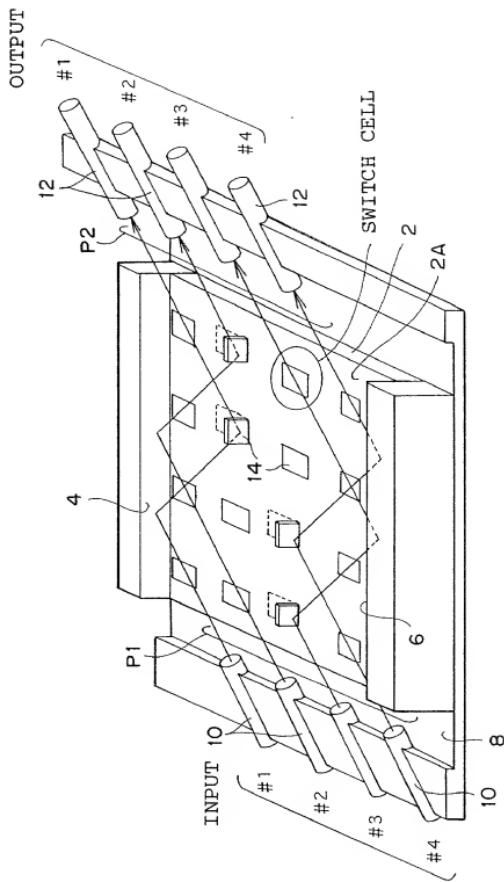


FIG.4A

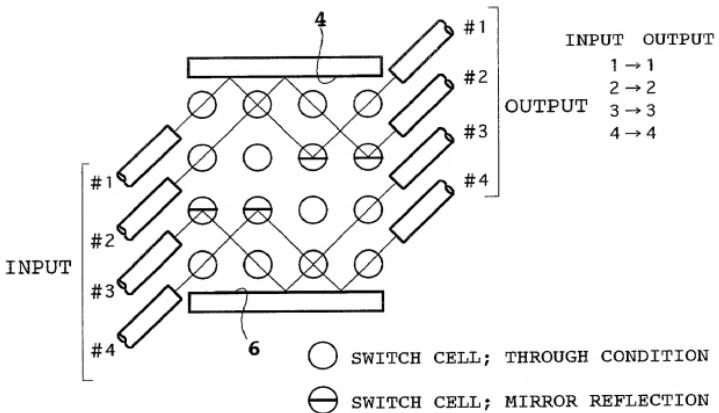


FIG.4B

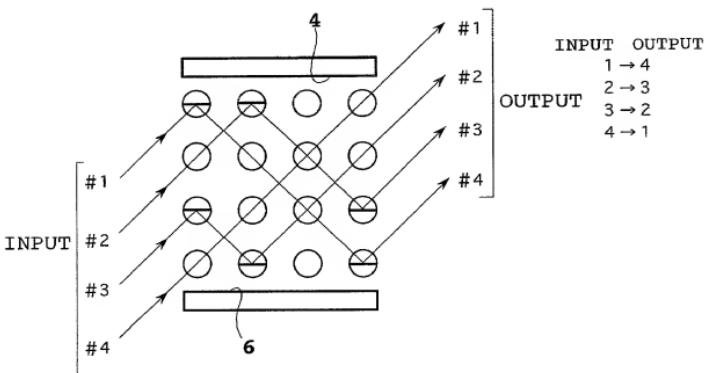
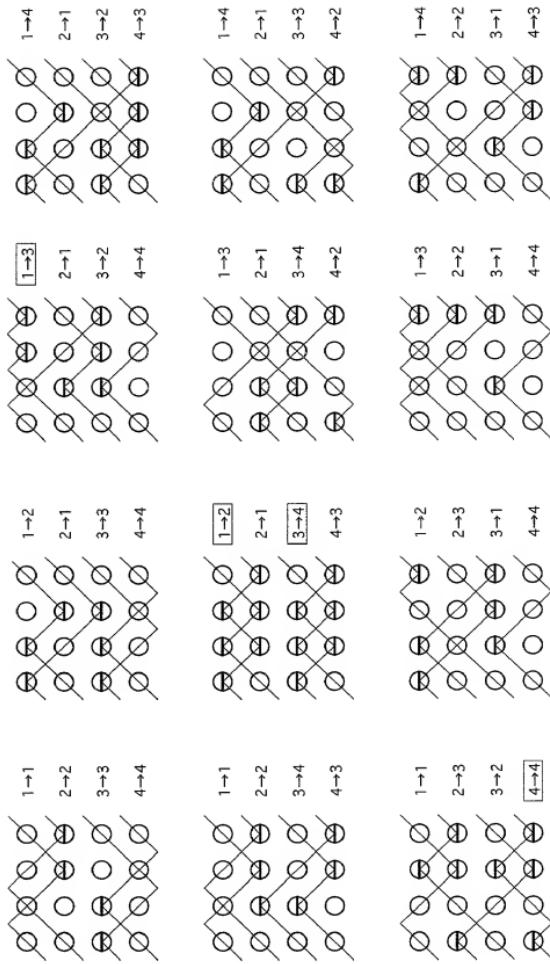


FIG. 5



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FIG. 6

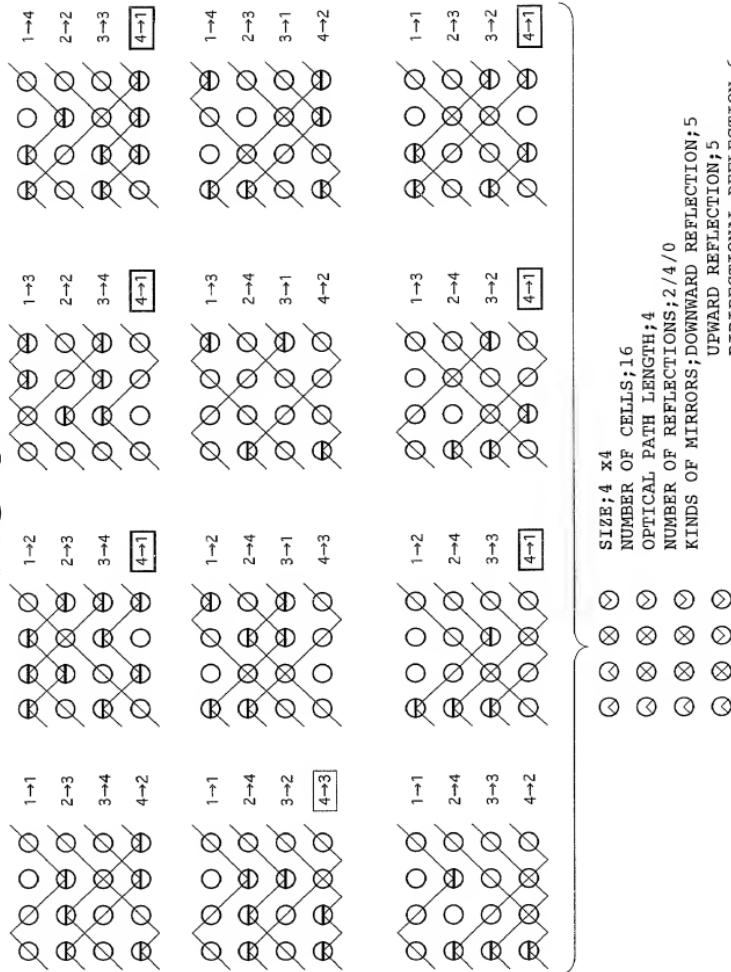
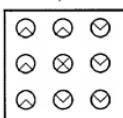
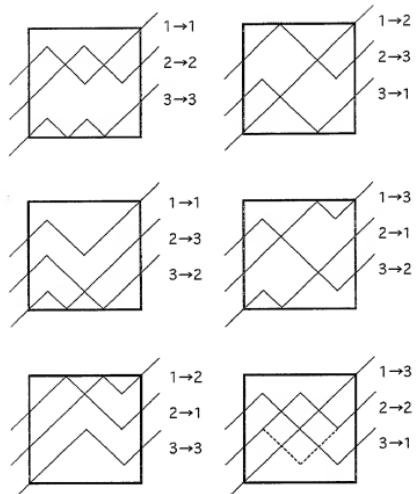


FIG.7A



SIZE;2 x 2
 OPTICAL PATH LENGTH ;2
 NUMBER OF REFLECTIONS;2/1
 KINDS OF MIRRORS;UPWARD REFLECTIN;2
 DOWNWARD REFLECTION;2
 NUMBER OF CELLS;4

2 x 2 OPTICAL SWITCH

SIZE;3 x 3
 OPTICAL PATH LENGTH ;3
 NUMBER OF REFLECTIONS;2/4/0
 KINDS OF MIRRORS;UPWARD REFLECTIN;4
 DOWNWARD REFLECTION;4
 BIDIRECTIONAL REFLECTION;1
 NUMBER OF CELLS;9

3 x 3 OPTICAL SWITCH

FIG.7B

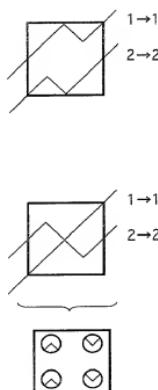
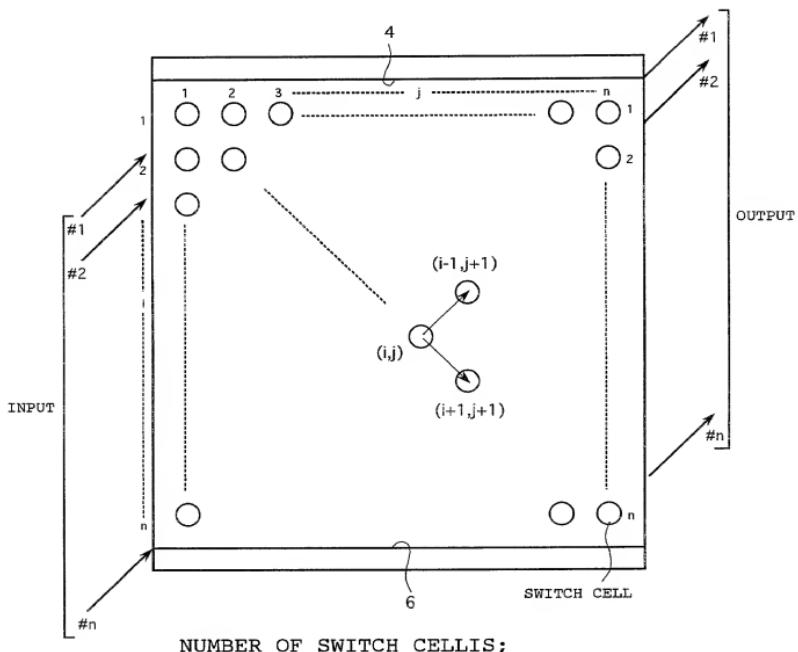


FIG.8



NUMBER OF SWITCH CELLS;

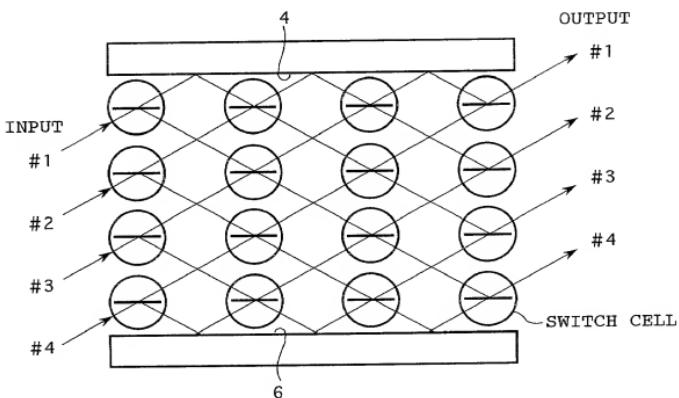
UPWARD REFLECTION; $n+1$

DOWNDWARD REFLECTION; $n+1$

BIDIRECTIONAL REFLECTION; $n^2 - 2n - 2$

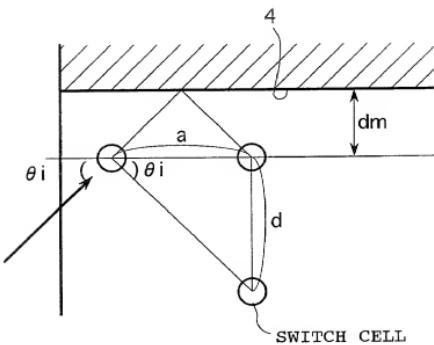
TOTAL NUMBER; n^2

FIG. 9



ANGLE OF INCIDENCE; 30°

FIG.10



$$d = a \cdot \tan \theta i$$

$$dm = 1/2 \cdot a \cdot \tan \theta i$$

FIG. 11

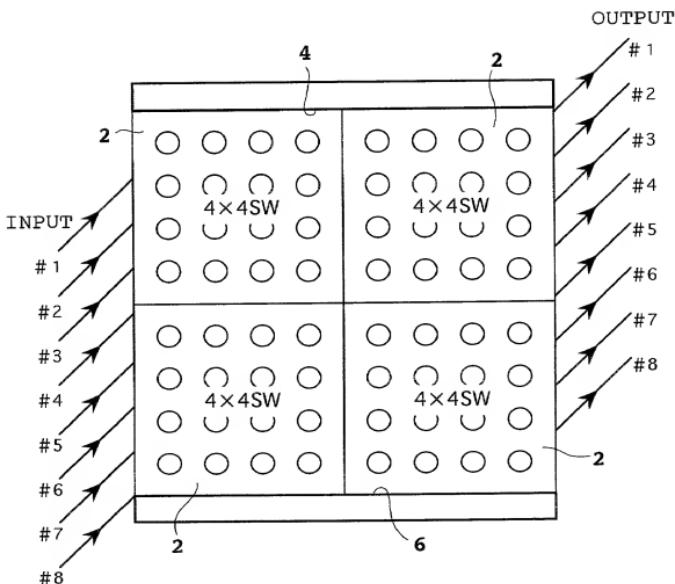


FIG.12A

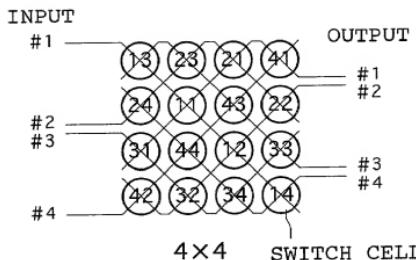


FIG.12B

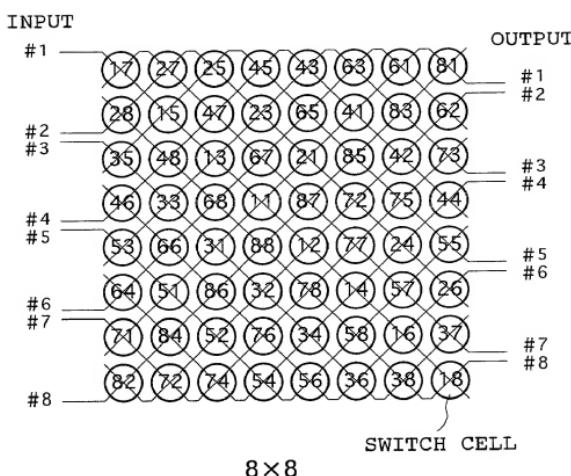


FIG.13A

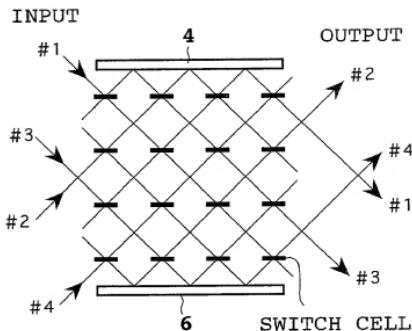


FIG.13B

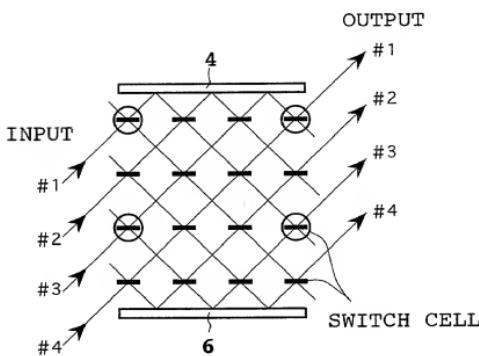


FIG. 14A

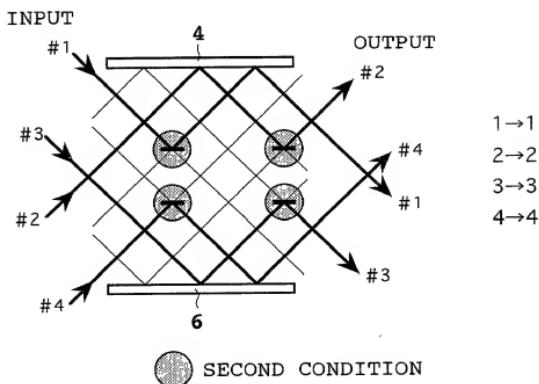
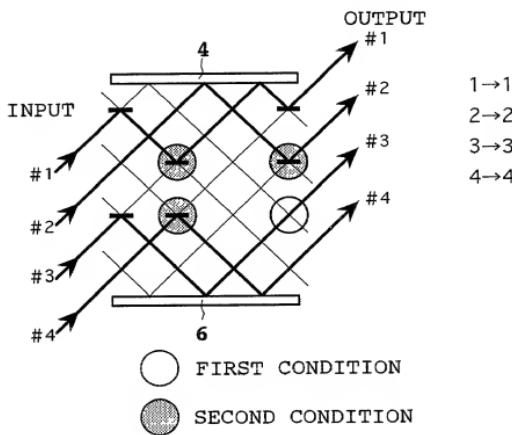


FIG. 14B



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FIG.15

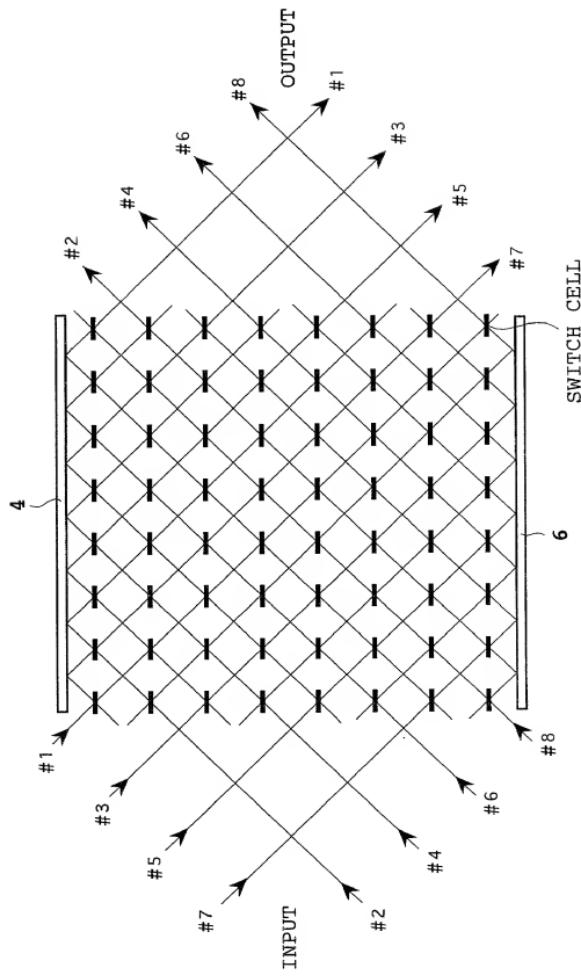


FIG.16

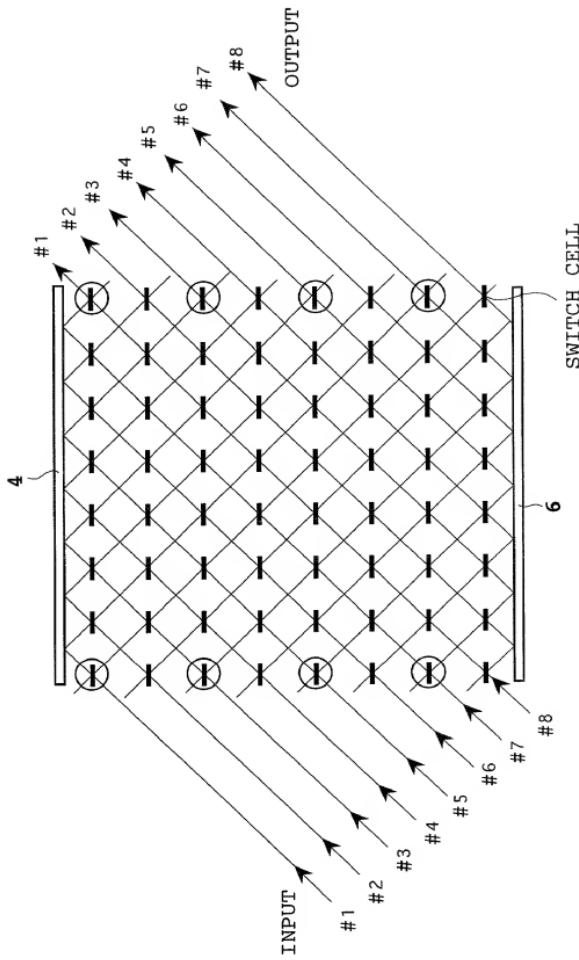


FIG.17A

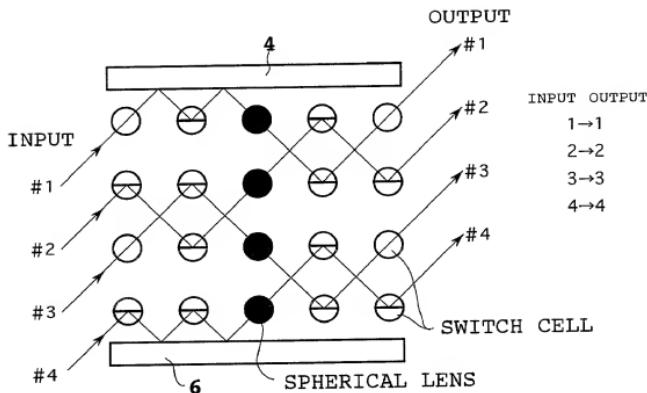
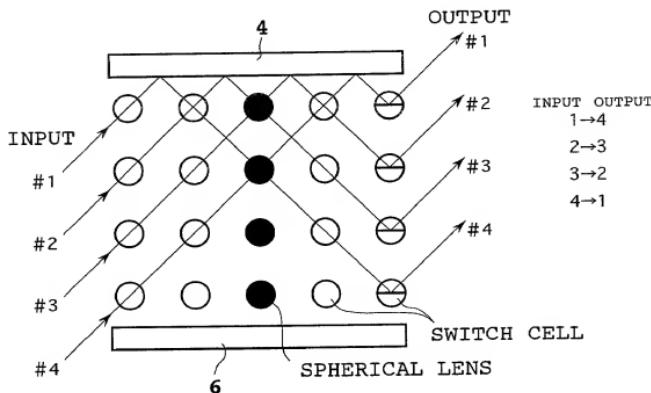
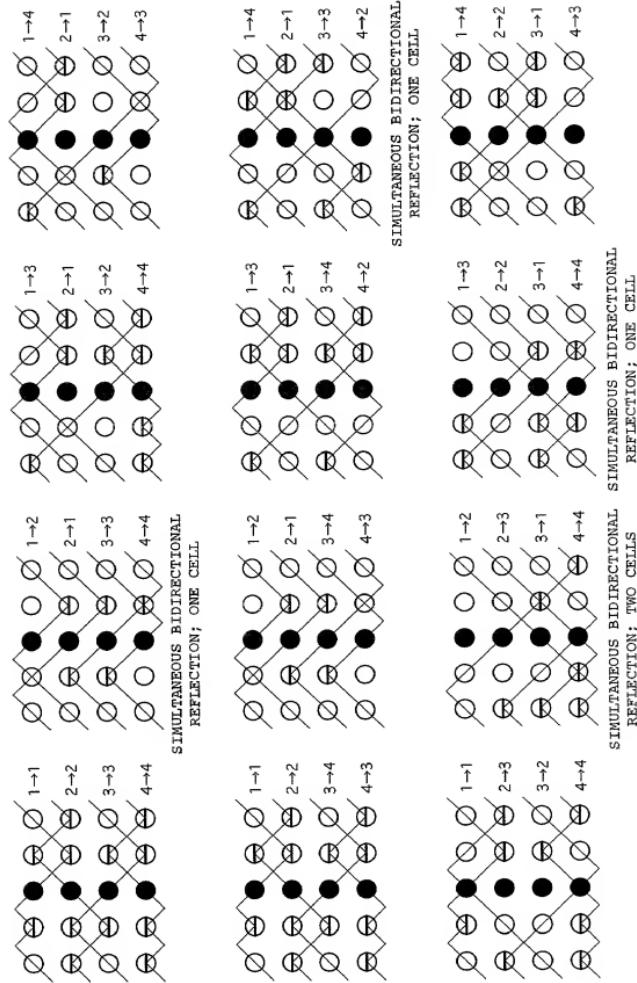


FIG.17B



T06080" 909+2660

FIG. 18



T06080" 909+2660

FIG. 19

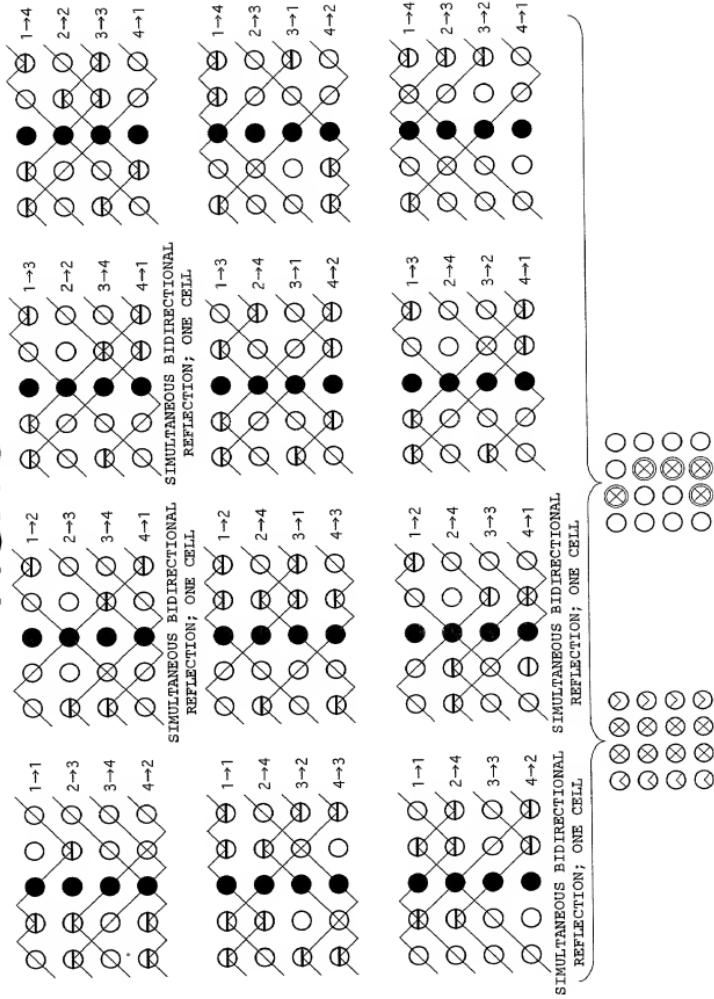
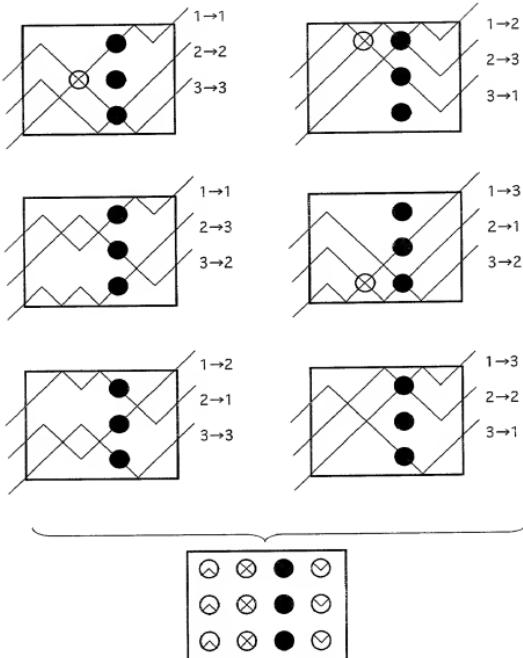
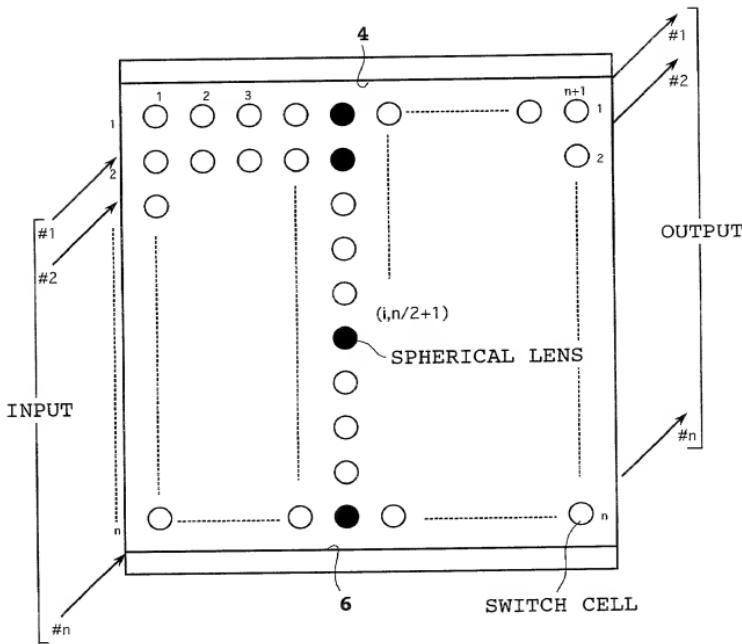


FIG.20



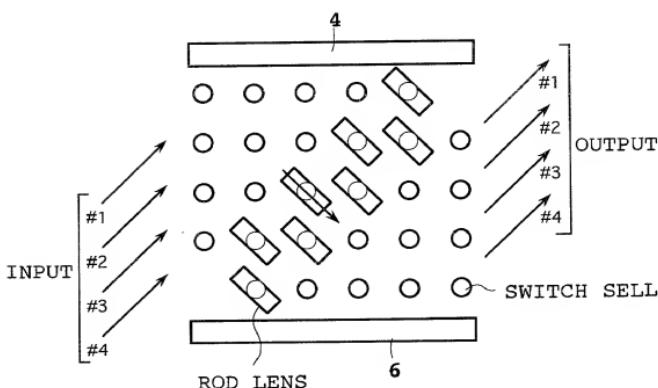
\otimes SIMULTANEOUS BIDIRECTIONAL
REFLECTION MIRROR

FIG.21



106080 " 90942660

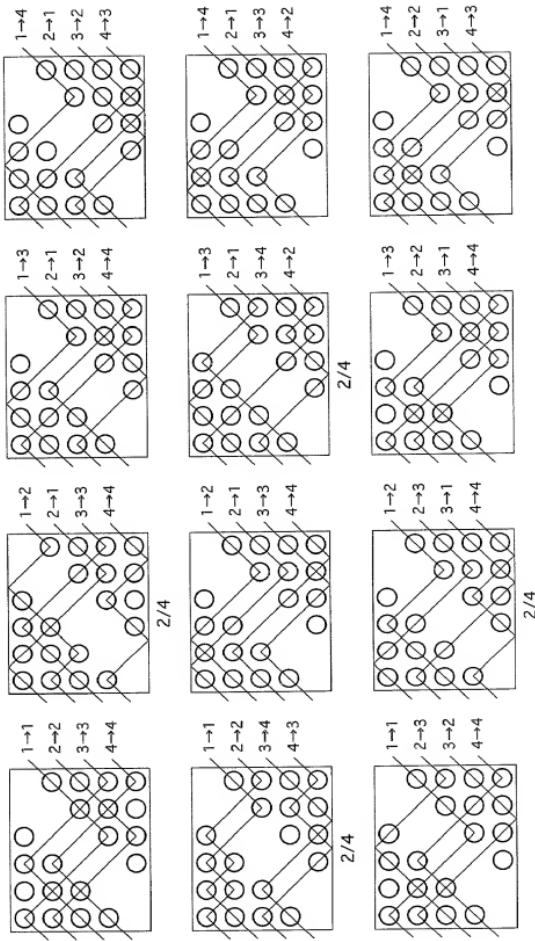
FIG.22



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106080 "00942660

FIG. 23



106080 "90942660

FIG.24

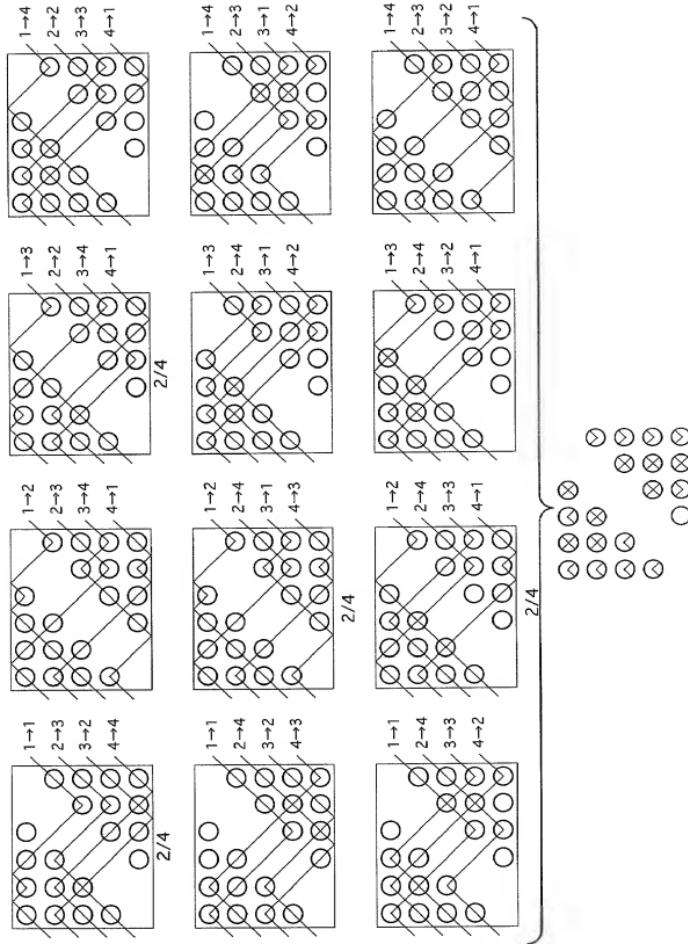
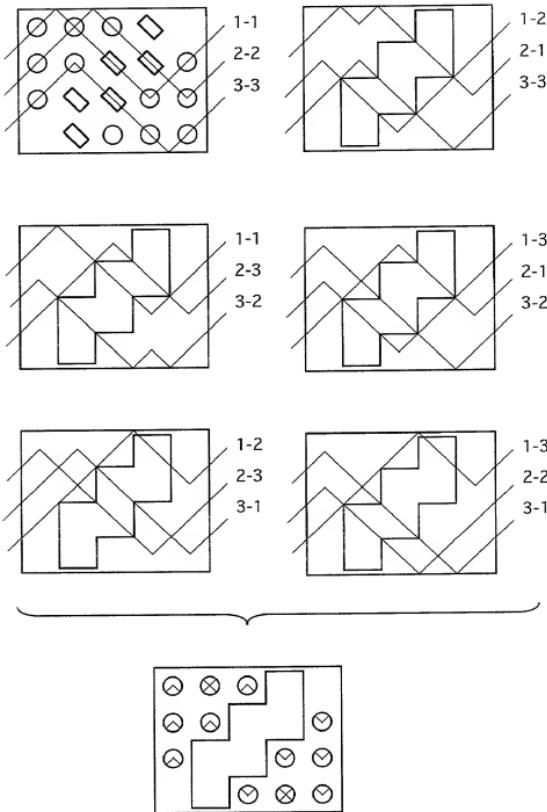
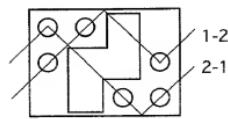
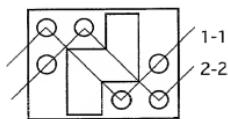


FIG.25

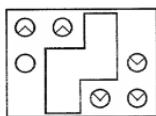


0996249606 - 080901

FIG.26

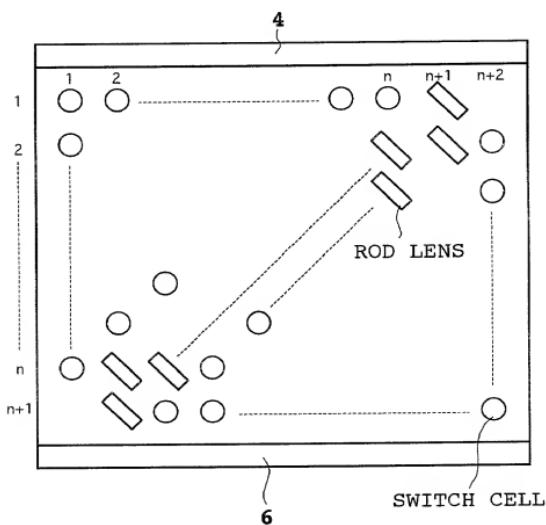


{



099214606 . 080901

FIG.27



09624605 . 080901

FIG.28

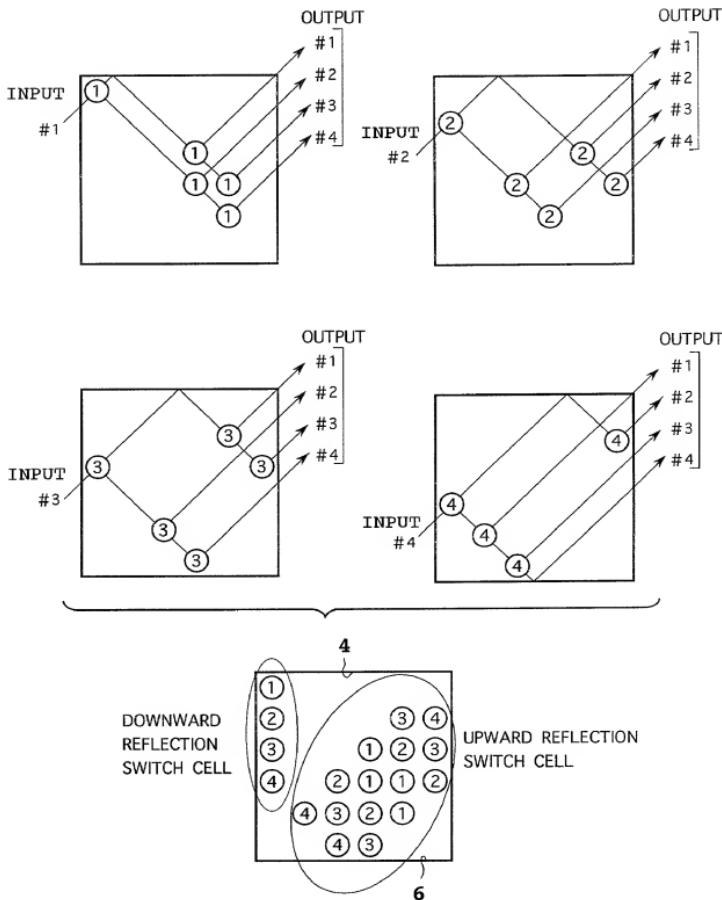


FIG.29

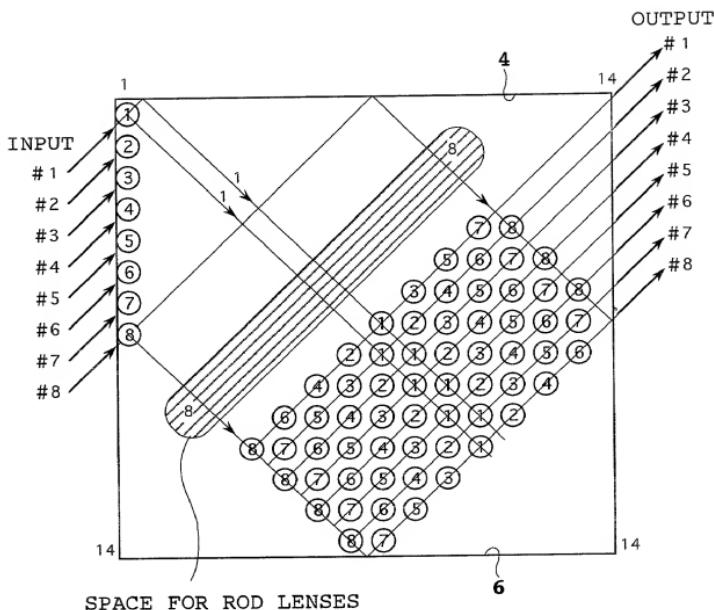


FIG.30

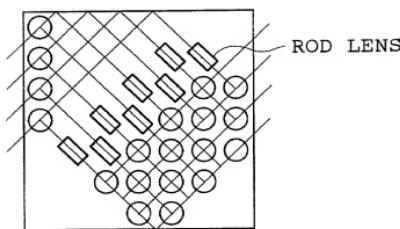
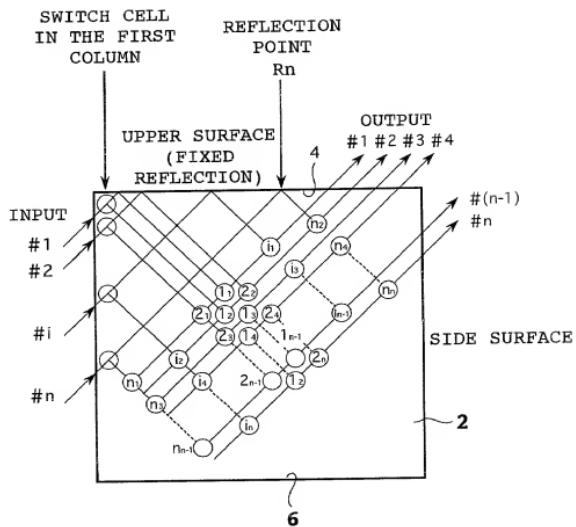


FIG.31



(n) : UPWARD REFLECTION SWITCH CELL FOR
CONNECTING INPUT CHANNEL $\#i$
TO OUTPUT CHANNEL $\#n$

FIG.32

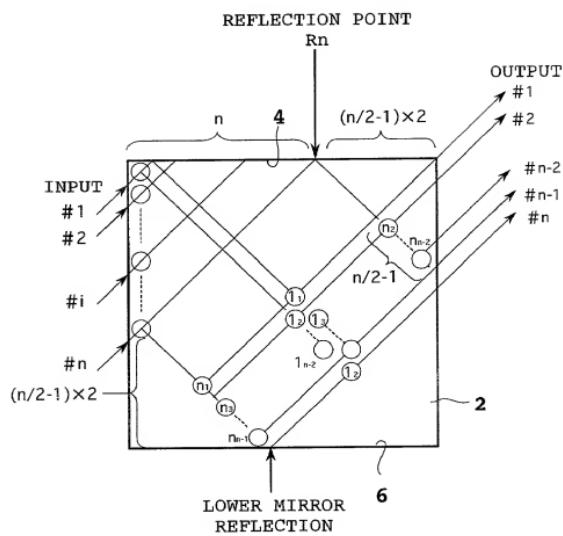


FIG.33

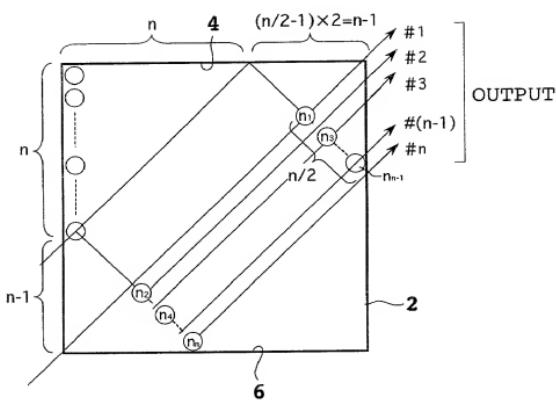
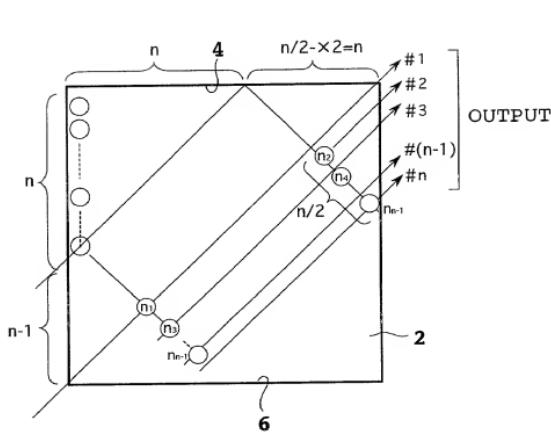
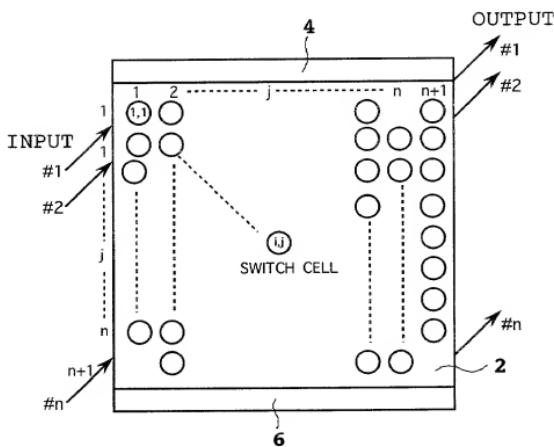


FIG.34



01060800 5054526660

FIG.35



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FIG.36

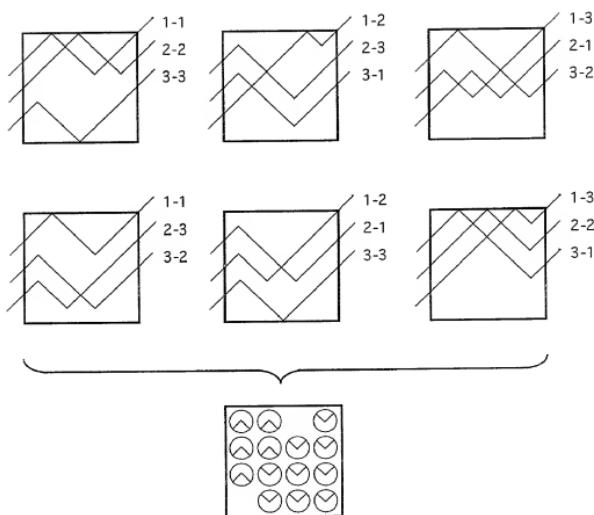
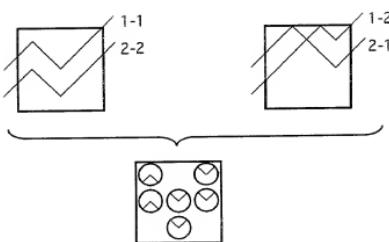


FIG.37



2 x 2 OPTICAL SWITCH

SIZE; 3 x 3

OPTICAL PATH LENGTH; 3

NUMBER OF CELLS; 6

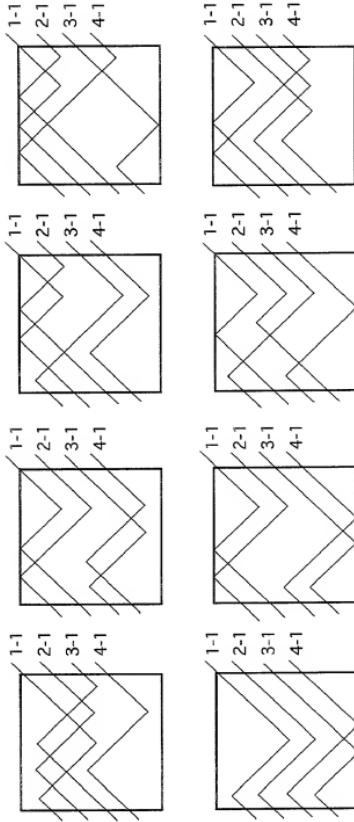
NUMBER OF UPWARD REFLECTION MIRRORS; 4

NUMBER OF DOWNWARD REFLECTION MIRRORS; 2

NUMBER OF REFLECTIONS ; ALWAYS 2

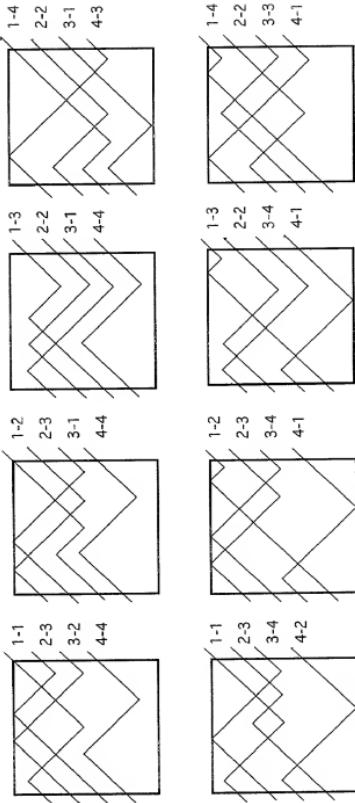
۱۰۶۰۸۰ "۹۰۹۴۲۶۶۰

FIG.38



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FIG.39



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FIG. 40

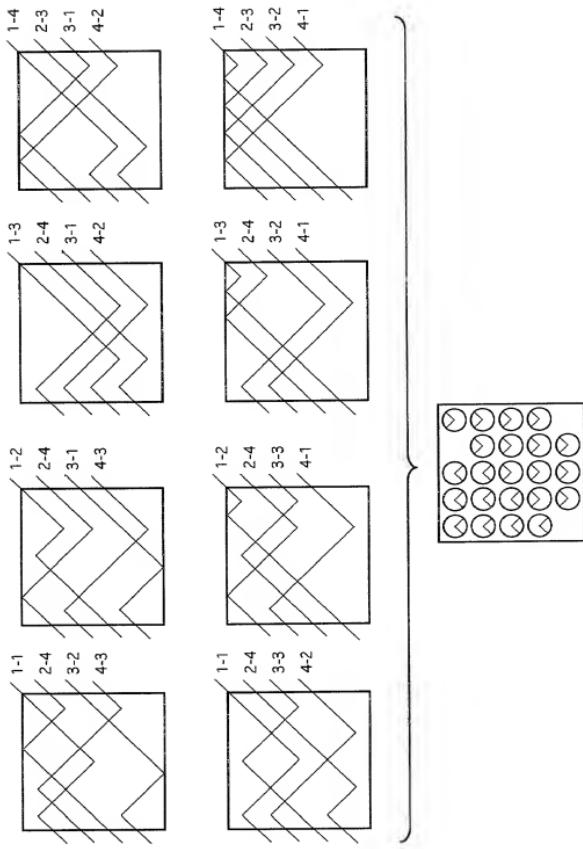
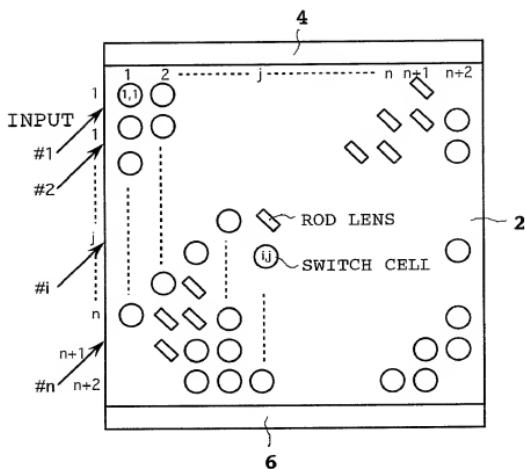
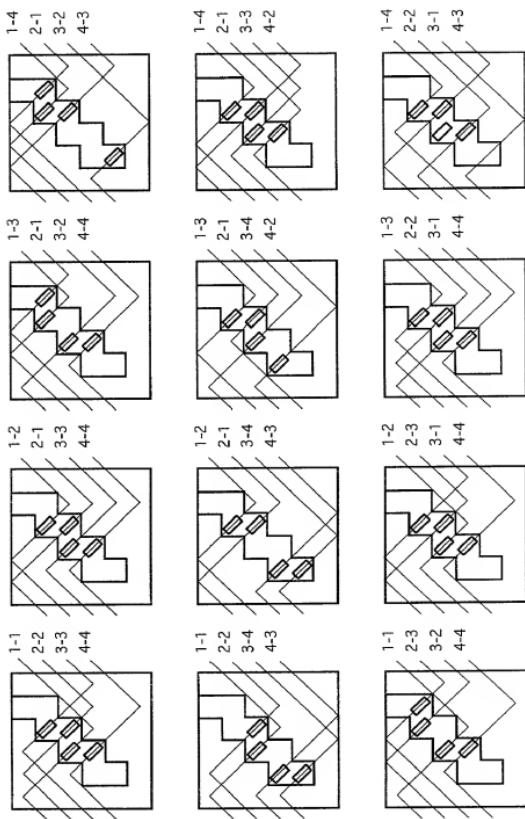


FIG.41



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FIG. 42



٢٠٦٠٨٠ " ٩٥٩٤٢٦٦٠

FIG. 43

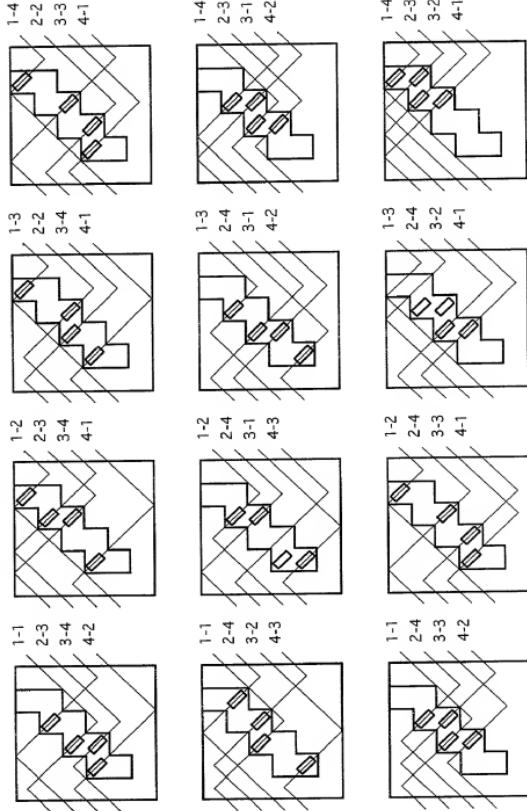


FIG.44

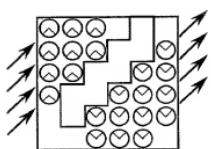
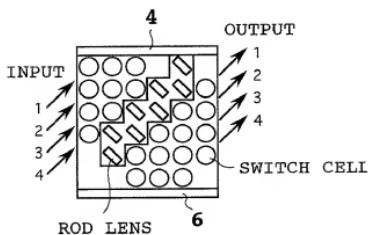


FIG.45

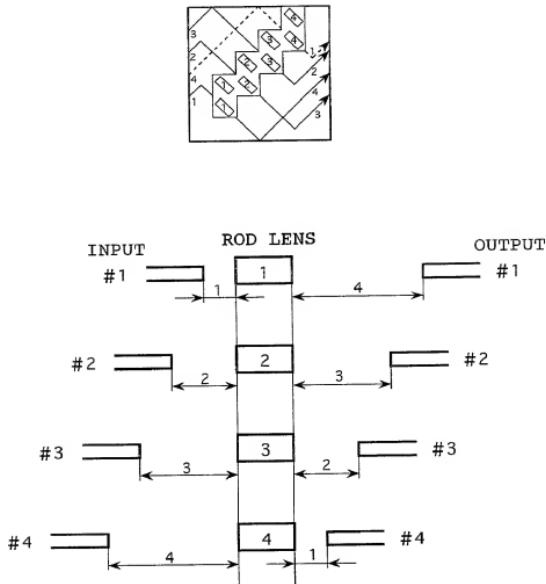


FIG.46

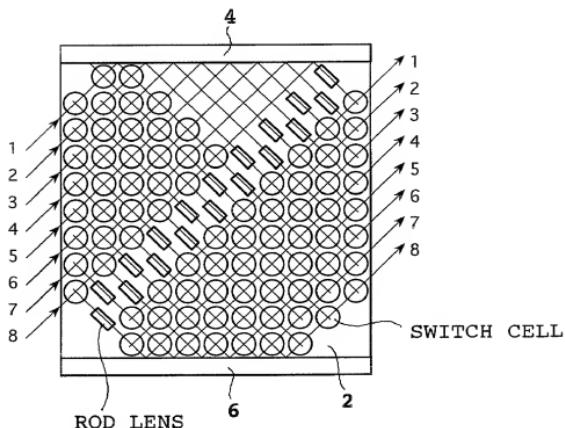


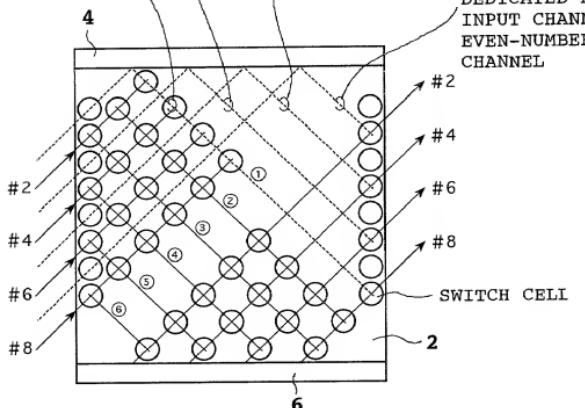
FIG.47

DEDICATED ROUTE FROM INPUT CHANNEL #1 TO EVEN-NUMBERED OUTPUT CHANNEL

DEDICATED ROUTE FROM INPUT CHANNEL #3 TO EVEN-NUMBERED OUTPUT CHANNEL

DEDICATED ROUTE FROM INPUT CHANNEL #5 TO EVEN-NUMBERED OUTPUT CHANNEL

✓ DEDICATED ROUTE FROM
INPUT CHANNEL #7 TO
EVEN-NUMBERED OUTPUT
CHANNEL



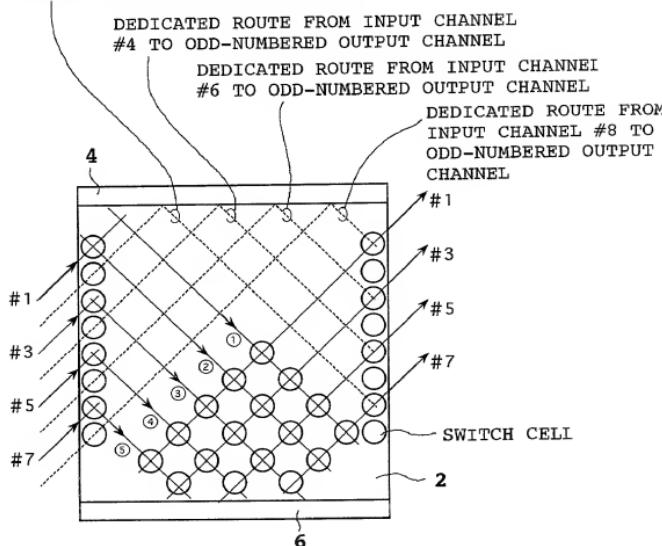
- ①, ②, ③ : ROUTES TO OUTPUT CHANNELS
#2, #4, #6, AND #8
 - ④ : ROUTES TO OUTPUT CHANNELS
#2, #4, AND #6
 - ⑤ : ROUTES TO OUTPUT CHANNELS
#2, AND #4
 - ⑥ : ROUTES TO OUTPUT CHANNELS
#2

INPUT CHANNEL	ROUTE TO EVEN-NUMBERED OUTPUT CHANNEL
2	①/②/③
4	①②③,④
6	①②③,④,⑤
8	①②③,④,⑤,⑥

INPUT CHANNEL	OUTPUT CHANNEL	ROUTE
2	2	① or ② or ③
4	4	① or ② or ③
6	6	④
8	8	① or ② or ③

FIG.48

DEDICATED ROUTE FROM INPUT CHANNEL
#2 TO ODD-NUMBERED OUTPUT CHANNEL



- ①, ② : ROUTES TO OUTPUT CHANNELS #1, #3, #5, AND #7
- ③ : ROUTES TO OUTPUT CHANNELS #1, #3, #5 AND #7 WHEN INPUT CHANNEL IS #3, #5, OR #7
- ④ : ROUTES TO OUTPUT CHANNELS #1, #3, AND #5
- ⑤ : ROUTES TO OUTPUT CHANNELS #1 AND #3

INPUT CHANNEL	ROUTE TO ODD-NUMBERED OUTPUT CHANNEL
1	①/②
3	①/②, ③
5	①/②, ③, ④
7	①/②, ③, ④, ⑤

INPUT CHANNEL	OUTPUT CHANNEL	ROUTE
1 → 1		① or ②
3 → 3		③
5 → 5		④
7 → 7		① or ②

FIG.49

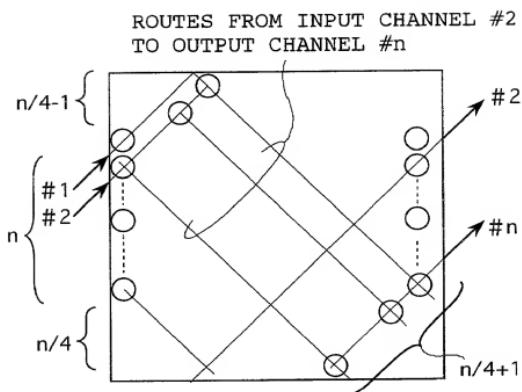
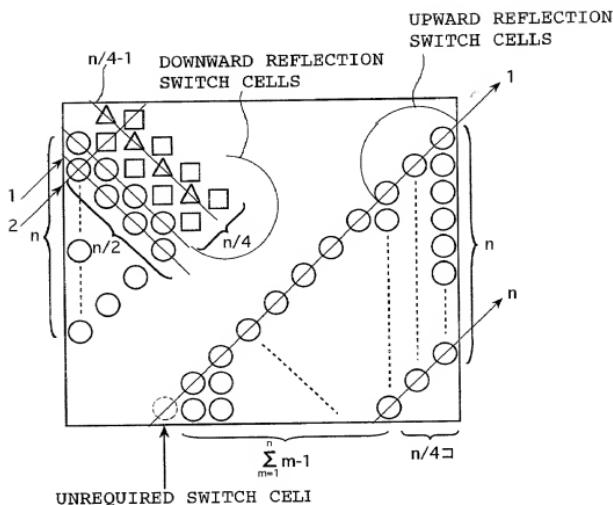


FIG.50



$$\text{NUMBER OF UPWARD REFLECTION SWITCH CELLS} : \sum_{m=1}^n m-1 + \frac{n}{4} \times n = \frac{n(n+1)}{2} - 1 + \frac{n^2}{4} = \frac{3}{4} n^2 + \frac{1}{2} n - 1$$

$$\text{NUMBER OF DOWNWARD REFLECTION SWITCH CELLS} : 2 \sum_{m=1}^{n/2} m + \frac{n}{4} \times \frac{n}{2} + (\frac{n}{4} - 1) \times \frac{n}{2} = \frac{n^2}{2}$$

SHOWN IN THE FIGURE
 SHOWN IN THE FIGURE
 SHOWN IN LEFT UPER PORTION OF THE FIGURE

$$\text{NUMBER OF ALL SWITCH CELLS} : \frac{5}{4} n^2 + \frac{1}{2} n - 1$$

FIG.51

